

Application No. 10/590,851
Filed: November 13, 2006
Rule 312 Amendment

07/23/2010

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously Presented) A signal processing module for wireless applications, comprising:
 - a Liquid Crystalline Polymer (LCP) layer having a first surface and a second surface opposite the first surface;
 - a first patterned metal layer on the first surface of the LCP layer;
 - a second patterned metal layer on the second surface of the LCP layer, wherein the first and second metal layers are patterned to form integrated components such that the first and second metal layers interact with one another to form a first resonator and a second resonator;
 - a first prepreg layer on the first metal layer opposite the LCP layer and a second prepreg layer on the second metal layer opposite the LCP layer;
 - a first laminate layer on the first prepreg layer opposite the first metal layer, and a second laminate layer on the second prepreg layer opposite the second metal layer;
 - a third metal layer on a first surface of the first laminate layer and patterned to form a first capacitor plate; and
 - a fourth metal layer on a second surface of the first laminate layer opposite the first surface and patterned to form a second capacitor plate, wherein the first capacitor plate and second capacitor plate form a parallel plate capacitor.
2. (Original) The module of Claim 1, wherein the first resonator comprises a first inductor formed in the first patterned metal layer and a second inductor formed in the second patterned metal layer, wherein the first inductor is connected by a first microvia to the second inductor.
3. (Original) The module of Claim 1, wherein the first resonator is magnetically coupled to the second resonator.

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4. (Original) The module of Claim 1, further comprising a third resonator formed in the first and second metal layers and electrically connecting the first resonator to the second resonator, wherein the third resonator provides a primary attenuation zero in a stopband.

5. (Original) The module of Claim 1, wherein the first and second resonators comprise transmission line resonators.

6. (Original) The module of Claim 1, wherein the first and second resonators comprise one or more of co-planar waveguide, stripline, or microstrip topologies.

7. (Canceled)

8. (Original) The module of Claim 1, further comprising a first shielding layer on the first laminate layer opposite the first prepreg layer and a second shielding layer on the second laminate layer opposite the second prepreg layer.

9. (Previously Presented) The module of Claim 1, wherein the integrated components include at least one of capacitors or inductors.

10. (Previously Presented) A diplexer for a multi-band wireless application, comprising:

a Liquid Crystalline Polymer (LCP) layer having a first surface and a second surface opposite the first surface;

a first patterned metal layer on the first surface of the LCP layer;

a second patterned metal layer on the second surface of the LCP layer, wherein the first and second metal layers are patterned to form integrated components such that the first and second metal layers interact with one another to form a first filter and a second filter connected by a common port;

a first prepreg layer on the first metal layer opposite the LCP layer, and a second prepreg layer on the second metal layer opposite the LCP layer;

a first laminate layer on the first prepreg layer opposite the first metal layer, and a second laminate layer on the second prepreg layer opposite the second metal layer;

a third metal layer on a first surface of the first laminate layer and patterned to form a first capacitor plate; and

a fourth metal layer on a second surface of the first laminate layer opposite the first surface and patterned to form a second capacitor plate, wherein the first capacitor plate and second capacitor plate form a parallel plate capacitor.

11. (Original) The diplexer of Claim 10, wherein the first filter comprises a first inductor formed in the first patterned metal layer and a second inductor formed in the second patterned metal layer, wherein the first inductor is connected by a first microvia to the second inductor.

12. (Previously Presented) The diplexer of Claim 10, wherein the first and second metal layers comprise one or more of co-planar waveguide, stripline, or microstrip topologies.

13. (Canceled)

14. (Original) The diplexer of Claim 10, further comprising a first shielding layer on the first laminate layer opposite the first prepreg layer and a second shielding layer on the second laminate layer opposite the second prepreg layer.

15. (Previously Presented) The diplexer of Claim 10, wherein the integrated components include at least one of capacitors or inductors.

16. (Currently Amended) A balun for a wireless application, comprising:

a high K organic layer having a first surface and a second surface opposite the first surface;

a first patterned metal layer on the first surface of the high K organic layer;

a second metal patterned metal layer on the second surface of the high K organic layer, wherein the first and second metal layers are patterned to form integrated components such that the first and second metal layers interact with one another to form a first passive device and a second passive device;

a first prepreg layer on the first metal layer opposite the high K organic layer, and a second prepreg layer on the second metal layer opposite the high K organic layer;

a first outer organic layer on the first prepreg layer opposite the first metal layer, and a second outer organic layer on the second prepreg layer opposite the second metal layer, wherein the first metal layer is patterned to form a first capacitor plate and the second metal layer is patterned to form a second capacitor plate; and

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a third metal layer on the first outer organic layer patterned to form a third capacitor plate, wherein the first, second and third capacitor plates form a capacitor.

17. (Original) The balun of Claim 16, wherein the first outer organic layer comprises one of a laminate layer, LCP layer or high K organic layer.

18. (Canceled).

19. (Previously Presented) The balun of Claim 16, wherein the integrated components include at least one of capacitors or inductors.

20. (Previously Presented) The balun of Claim 16, further comprising a first shielding layer on the first outer organic layer opposite the first prepreg layer and a second shielding layer on the second outer organic layer opposite the second prepreg layer.

21. (Previously Presented) A signal processing module for multi-band wireless applications, comprising:

a first Liquid Crystalline Polymer (LCP) layer having a first surface and a second surface opposite the first surface;

a first patterned metal layer on the first surface of the first LCP layer;

a second patterned metal layer on the second surface of the first LCP layer;

a second LCP layer having a first surface and a second surface opposite the first surface;

a third patterned metal layer on the first surface of the second LCP layer;

a fourth patterned metal layer on the second surface of the second LCP layer, wherein the first, second, third and fourth metal layers are patterned to form integrated components, the integrated components comprising at least a first filter and a second filter connected by a common port;

a first prepreg layer disposed between the first and second LCP layers;

a second prepreg layer on the second metal layer opposite the first LCP layer, and a third prepreg layer on the third metal layer opposite the second LCP layer; and

a first outer organic layer on the second prepreg layer opposite the second metal layer, and a second outer organic layer on the third prepreg layer opposite the third metal layer.

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22. (Original) The module of Claim 21, further comprising a first shielding layer on the first outer organic layer opposite the second prepreg layer and a second shielding layer on the second outer organic layer opposite the third prepreg layer.

23. (Original) The module of Claim 21, wherein the first outer organic layer comprises one of a laminate layer, LCP layer or high K organic layer.

24. (Original) The module of Claim 21, further comprising a first RCF layer on first outer organic layer opposite the second prepreg layer; and

a second RCF layer on the second outer organic layer opposite the third prepreg layer.

25. (Previously Presented) A signal processing module, comprising:

an unfilled Liquid Crystalline Polymer (LCP) layer having a first surface and a second surface opposite the first surface;

a first patterned metal layer on the first surface of the LCP layer;

a second patterned metal layer on the second surface of the LCP layer, wherein the first and second metal layers are patterned to form at least a first resonator, a second resonator, a third resonator, and a feedback capacitor, the third resonator connecting the first and second resonators, and the feedback capacitor connected in parallel with the third resonator;

a first prepreg layer on the first metal layer opposite the LCP layer and a second prepreg layer on the second metal layer opposite the LCP layer;

a first laminate layer on the first prepreg layer opposite the first metal layer, and a second laminate layer on the second prepreg layer opposite the second metal layer.

26. (Previously Presented) The module of Claim 25, wherein the third resonator provides one or more attenuation zeroes in a stopband.

27. (Previously Presented) The module of Claim 26, wherein the feedback capacitor alters a respective location of the one or more attenuation zeroes.

28. (Previously Presented) The module of Claim 25, wherein the first and second metal layers are further patterned to form a first impedance matching capacitor and a second impedance matching capacitor, wherein the first impedance matching capacitor is connected between the feedback capacitor and the first resonator, and wherein the second impedance matching capacitor is connected between the feedback capacitor and the second resonator.

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29. (Previously Presented) The module of Claim 25, wherein the first resonator comprises a first inductor formed in the first patterned metal layer and a second inductor formed in the second patterned metal layer, wherein the first inductor is connected by a first microvia to the second inductor.

30. (Previously Presented) The module of Claim 25, wherein the first resonator is magnetically coupled to the second resonator.

31. (Previously Presented) The module of Claim 25, wherein the first and second resonators comprise transmission line resonators.

32. (Previously Presented) The module of Claim 25, wherein the first and second resonators comprise one or more of co-planar waveguide, stripline, or microstrip topologies.

33. (Previously Presented) The module of Claim 25, further comprising a third metal layer on a first surface of the first laminate layer and patterned to form a first capacitor plate, and a fourth metal layer on a second surface of the first laminate layer opposite the first surface and patterned to form a second capacitor plate, wherein the first capacitor plate and second capacitor plate form a parallel plate capacitor.

34. (Currently Amended) The module of Claim 33, wherein the parallel plate capacitor is a lowpass capacitor connected in parallel with either the first resonator or the second resonator, the lowpass capacitor operative to provide one or both of second harmonic attenuation or third harmonic attenuation.

35. (Previously Presented) The module of Claim 25, further comprising a first shielding layer on the first laminate layer opposite the first prepreg layer and a second shielding layer on the second laminate layer opposite the second prepreg layer.

36. (Previously Presented) The module of Claim 25, wherein the integrated components include at least one of capacitors or inductors.